

Misc. Publication A39.

THE KENT INCORPORATED SOCIETY
FOR PROMOTING EXPERIMENTS IN
HORTICULTURE

ADMINISTRATIVE REPORT

(FORTY-THIRD YEAR)

GENERAL DEVELOPMENT AND ACTIVITIES

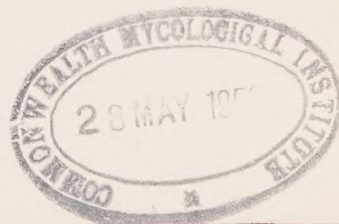
EAST MALLING RESEARCH STATION

Near MAIDSTONE

KENT

1st October, 1954, to 30th September, 1955

Published June, 1956.



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Appointed by the Staff Council of East Malling Research Station:

S. C. PEARCE, Esq., Ph.D.

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Captain R. WELLINGTON, M.C., Colescus, Gorran Haven, St. Austell, Cornwall

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STAFF

(1ST OCTOBER, 1955)

Director : F. R. TUBBS,* M.Sc.(Lond.), Ph.D.(Lond.), A.R.C.S., D.I.C., F.L.S.

Assistant to Director : T. N. HOBLYN,* Hort.Dip.(Wye).

Pomology:

W. S. ROGERS,* M.A.(Cantab.), D.Sc.(Lond.), Dip.Hort.
(Cantab.), A.Inst.P.

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C. H. W. SLATER.

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Miss M. G. FROMOW, B.Sc.(Reading). (*Appointed December, 1954.*)

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Miss M. TAPLEY.

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Miss M. M. FULLER.

Miss J. C. WOOD.

Miss M. E. BROWN.

(*Appointed September, 1954.*)

J. F. NAYLOR.

(*Appointed March, 1955.*)

Miss P. B. TOPHAM.

(*Appointed May, 1955.*)

Statistics:

T. N. HOBLYN.*

S. C. PEARCE, Ph.D.(Lond.). *Deputy Head of Section.*

G. M. JOLLY, B.Sc.(Aberdeen).

G. H. FREEMAN, M.A., Dip.Stat.(Oxon.).

D. A. HOLLAND, B.Sc.(Lond.).

A. H. F. BROWN, B.Sc.(Wales). (*Appointed September, 1955.*)

Assistants (Scientific) :

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Miss J. A. DOLDING.

W. J. DUNFORD. (*Appointed April, 1955.*)

Plant Physiology:

H. W. B. BARLOW, B.Sc.(Edin.).

M. C. VYVYAN,* M.A.(Cantab.), D.Sc.(Lond.).

D. H. MAGGS, B.Sc.(Reading).

H. J. LACEY, M.Sc.(Nottingham).

G. F. TROWELL.

* Recognized Teacher of the University of London.

Plant Physiology—continued

Assistants (Scientific) :

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Miss F. LAMB.

T. J. K. SHOWLER. (*Appointed August, 1955.*)

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B. D. BOLAS,* D.Sc.(Lond.), D.I.C.

E. S. J. HATCHER, Ph.D.(Bristol).

C. R. HANCOCK, B.Sc.(Bristol).

F. W. M. LLEWELYN, B.Sc.(Lond.), A.R.C.S.

I. F. BIRD, B.Sc.(Lond.).

Miss C. C. MACNAMARA.

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Miss S. A. FARTHING.

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Biochemistry: A. E. FLOOD, M.A.(Cantab.), Ph.D.(Manc.).

Assistants (Scientific) :

H. HUTCHINS, A.I.S.T.

Miss V. WOOD. (*Appointed May, 1955.*)

Plant Analysis: A. C. MASON, B.Sc.(Lond.), F.R.I.C.

H. J. PHILCOX, A.I.S.T.

A. B. WHITFIELD, B.Sc.(Dunelm). (*Appointed October, 1955.*)

Assistants (Scientific) :

E. C. WILLS.

Miss M. LINGHAM.

Miss B. M. KIDWELL.

(*Appointed June, 1955.*)

R. NEVE.

D. F. J. DEER.

Miss M. E. JENNER.

(*Appointed September, 1955.*)

Miss L. D. GOODGER.

Miss B. J. JENNER.

Miss E. M. BRETT.

(*Appointed September, 1955.*)

Miss J. M. BURREN.

(*Appointed October, 1954.*)

Fruit Nutrition: D. W. P. GREENHAM, M.A., Ph.D.(Cantab.).

Miss A. V. DELAP, B.A., B.Sc.(Dublin).

J. E. GOODE, B.Sc.(Birmingham).

Miss E. M. FORD, B.Sc.(Lond.), A.R.C.S.

G. C. WHITE, B.Sc.Hort.(Nottingham). (*Appointed December, 1954.*)

Assistants (Scientific) :

K. J. HYRYCZ, N.D.H.

D. A. FOAD. (*Appointed May, 1955.*)

Plant Pathology: R. V. HARRIS,* D.Sc.(Lond.), A.R.C.S., D.I.C., M.I.Biol.

M. H. MOORE, M.Sc.(Reading), Ph.D.(Lond.), Dip.Hort.
(Reading).

A. F. POSNETTE, M.A.(Cantab.), Ph.D.(Lond.), A.I.C.T.A.

J. E. CROSSE, Ph.D.(Lond.), B.Sc.(Birmingham).

D. S. KIRKHAM, Ph.D.(Lond.).

P. W. TALBOYS, Ph.D.(Lond.), D.I.C., M.I.Biol.

Plant Pathology—continued

Miss M. BENNETT, B.Sc.Hort.(Lond.), Dip.Hort.(Swanley),
Field records ; also attached Entomology and Plant Protec-
tive Chemistry.

J. T. LEGG, B.Sc.(Lond.).

G. W. F. SEWELL, Ph.D.(Lond.). (*Appointed November, 1954.*)

P. J. ORMEROD, B.A.(Cantab.).

J. F. WILSON, B.Sc.(Wales).

R. CROPLEY, N.D.H.(Hons.), Dip.Hort.(Reading).

Miss E. C. E. ELLENBERGER, B.Sc.Hort.(Lond.).

Miss P. WEBB, B.Sc.(Lond.) *Field records ; also attached*
Entomology and Plant Protective Chemistry.

Miss S. E. BALL, B.Sc.Hort.(Lond.). (*Appointed March, 1955.*)

Assistants (Scientific) :

R. D. SOUTER.

B. S. BROOK.

Miss J. RICHARDSON.

Miss D. LAURENCE.

Miss C. R. WESTWOOD.

Miss C. A. BOLTON.

J. E. STICKELS.

(*Appointed February, 1955.*)

Entomology:

A. M. MASSEE,* O.B.E., D.Sc.(Lond.), F.R.E.S.

G. H. L. DICKER, Ph.D.(Lond.), A.R.C.S., F.R.E.S.

R. S. PITCHER, Ph.D.(Lond.), Dip.Agric.(Wye), Dip.Ento.(Wye),
Nematodes.

Miss E. COLLYER, Ph.D.(Lond.), *Beneficial Insects of Fruit.*

L. A. LICKERISH, M.A.(Cantab.), B.Sc.(Lond.), *Insecticides,*
attached to Plant Protective Chemistry.

R. C. MUIR, B.Sc.(Birmingham), F.R.E.S., *Ecological studies.*

J. R. CHISWELL, B.Sc.(Bristol), F.R.E.S., *Tortricidae and*
Homoptera. (*Appointed October, 1955.*)

J. B. BRIGGS, B.Sc.Hort.(Reading), *Carabidae of soft fruits.*

Assistants (Scientific) :

E. F. SOUTER.

D. J. CARDY.

Miss D. V. MERTON.

Miss D. ENGLISH.

D. K. BROWN.

Plant Protective Chemistry: A. H. M. KIRBY, M.Sc.(Lond.), Ph.D.(Lond.),
A.R.I.C.

M. ALLEN, B.Sc.(Lond.).

R. P. TEW, A.R.I.C.

R. G. GAMBRILL.

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1955.)

Assistants (Scientific) :

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Miss S. GAMMON.

Miss C. A. PUGH.

(*Appointed January, 1955.*)

G. J. HITCHINGS.

A. H. GREGORY.

(*Appointed May, 1955.*)

Fruit Storage Investigations : (*In collaboration with the Ditton Laboratory.*)

H. B. S. MONTGOMERY, B.A.(Dublin), Ph.D.(Lond.), D.I.C.

Miss S. M. MORRISSEY, B.Sc.(Lond.). (*Appointed August,*
1955.)

Fruit Storage Investigations—continued

Assistants (Scientific) :

Miss E. LAWRENCE.

A. H. STILL. (*Appointed September, 1955.*)

Scientific Liaison: H. B. S. MONTGOMERY.

J. H. WALKER, B.Sc.Agric.(Reading).

A. C. PAINTER, O.B.E. *Part-time.*

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A. E. H. RUTTER, B.A.(Cantab.), Dip.Agric.(Cantab.).

F. W. ANDREWS, D.Sc.(Lond.), Ph.D.(Lond.), A.R.C.S.
Attached.

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C. H. W. SLATER.

Librarian : S. R. BALL, B.A.(Lond.), F.L.A.

Photographer : E. YOXALL JONES.

Assistant (Scientific) :

Miss B. M. SMITH.

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Assistant Plantations Officer: Miss B. F. SEYMOUR.

Experimental Nurseries : H. R. J. BYFORD.

Experimental Greenhouses : M. M. MACNEILL, B.Sc.Hort.(Wye), C.D.H.(Glas.).
A. TIDY.

M. COLE. (*Appointed February, 1955.*)

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Workshops : G. G. M. WELLER.

F. A. KING. *Laboratory Instrument Mechanic.*

K. W. J. BUNYARD. *Laboratory Instrument Mechanic.*

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C. BATES, B.E.M. (40).

E. HAYES (32) (*Caretaker.*)

J. DENYER (35).

W. HENSON (31) (*Fruit Foreman*).

E. WENHAM (35).

W. JENNER (29).

W. HORTON (33).

J. A. BROOKER (26).

H. CRITTENDEN (32).

F. J. PAGE (25).

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Accountant and Assistant to the Secretary : R. L. OXLEY.

Director's Personal Secretary : Miss P. D. S. GOLD.

Administration—continued

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Miss R. M. WICKHAM.

Miss J. C. IRVING.

Miss A. SLOMAN.

(*Transferred May, 1955.*)

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Miss M. A. BAKER.

(*Appointed June, 1955.*)

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Miss S. V. M. PRESTON.

(*Appointed June, 1955.*)

Miss E. D. DAVIS.

Miss W. E. ASHDOWN.

Miss A. TUCK.

(*Appointed August, 1955.*)

Mrs. F. J. PARKES (*Part-time*).

Miss M. GARDNER.

Miss M. D. RIDGE.

(*Appointed September, 1955.*)

(*Appointed February, 1955.*)

Accounts Staff :

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P. R. WOOD.

Miss R. P. J. WATSON.

Miss D. L. CARD.

(*Appointed December, 1954.*)

Miss E. J. MORLEY.

L. H. HART.

Miss G. E. WRIGHT.

(*Appointed October, 1955.*)

Housekeeper : Miss A. M. BOOTH.

VISITORS

Tours of the Station are arranged by appointment on Tuesday and Thursday afternoons. Visitors with special interests are received by appointment on the mornings of these days and may then join the general tour later if they wish. Wednesdays and Fridays are reserved for visiting research workers who also should make an appointment to ensure that a useful programme for the visit can be prepared.

All visitors wishing to see the work of the Station should go to the Reception Room in the N.F.U. Building at the Research Laboratories.

Visitors coming by road should take the turning to East Malling, opposite "The Bull", Larkfield, on the main London-Maidstone road. The entrance gate to the Research Station is on the left, opposite the "King and Queen" in East Malling.

Bus Service : From Maidstone by the Maidstone and District Motor Services Limited, every 20 minutes from Maidstone to East Malling.

Passenger Station : EAST MALLING HALT (British Railways, Southern Region).

Goods Station : WEST MALLING (British Railways, Southern Region).

Correspondence : All correspondence should be addressed to the East Malling Research Station, near Maidstone, Kent.

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THE COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

*Accommodated at Bradbourne, the Administrative Headquarters of the East Malling
Research Station.*

STAFF

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Consultant Director : F. R. TUBBS, M.Sc.(Lond.), Ph.D.(Lond.), A.R.C.S., D.I.C.,
F.L.S.

Assistant Director : G. K. ARGLES, Dip.Hort.(Wye), A.I.C.T.A.

Assistants : V. H. GOLDSCHMIDT, Ph.D.(Berlin).

J. DUNDAS, B.Sc.For.(Edin.).

Miss P. J. ROWE-DUTTON, B.Sc.Hort.(Lond.).

Mrs. E. ULYATT, Dip.Hort.(Eisgrub).

Miss E. M. J. NAPIER, B.Sc.Hort.(Lond.).

Clerical Staff : Miss M. B. ROGERS, Miss M. M. DURLING, Miss M. EDWARDS,
Miss J. BARKER, Mrs. E. M. HOPKINS (*Appointed July, 1955*).

NATIONAL AGRICULTURAL ADVISORY SERVICE

Accommodated at East Malling Research Station

Telephone : West Malling 2418.

PROVINCIAL ADVISORY OFFICER—FRUIT, SOUTH-EASTERN
PROVINCE

W. G. KENT, N.D.H.

Clerical Assistant : Mrs. D. NYE. (*Part-time.*)

GENERAL DEVELOPMENT AND ACTIVITIES

INTRODUCTORY

The real test of the usefulness of a Station such as this, apart from any contribution it may make to the advancement of horticultural science, lies in the service that it gives to fruit growers. This year, in presenting their Forty-third Report, the Committee would draw attention to this aspect of the Station's activities.

It is nine years since the formation of the N.A.A.S. and many growers now look to its officers for advice on their day-to-day problems. The Station's relations with the N.A.A.S. remain excellent and all possible opportunities are made to keep advisory officers fully informed about the progress of research, so that they may relay any new knowledge to growers as quickly as possible. We are glad to report that these facilities are fully made use of. Nevertheless, many up-to-date fruit growers, and there should be more, wish to keep in even closer touch with research and for these the East Malling Research Station Association provides the key, offering advantages that are not open to all, a fact which a glance through the pages of this Report will make clear.

While Members may look mainly to the Research Report, this is by no means the only outlet for the results of our investigations. In the last five years 258 scientific papers and 98 popular articles have been published. This gives some idea of the volume of written reports, but takes no account of the information given verbally to those Members who visit the Station on their special days.

Throughout this Report will be found many indications of the strength of the ties between fruit growers and research workers. The Committee hope these will become even stronger in future years.

GOVERNING MEMBERS

The Station is fortunate in having no changes in the Governing Body to report during the year. We would congratulate Mr. F. A. Secrett on his appointment as an honorary fellow of the Royal Agricultural Society in recognition of his outstanding work for the horticultural industry. He has represented the Royal Horticultural Society since 1939. Dr. S. C. Pearce was re-elected as representative of the Staff Council ; during his absence in India, Mr. R. J. Garner, his predecessor, acted in his stead.

We shall allude later to the completion of the Station's laboratory extensions. On their special day, the Governors entertained to lunch at Bradbourne as many as possible of those who had contributed to the success of this major scheme. Among the guests were representatives of the Agricultural Research Council, the Ministry of Agriculture, including the Permanent Secretary, Sir Alan Hitchman, Messrs. Lanchester and Lodge, the architects, and Messrs. G. E. Wallis & Sons, Ltd., the builders. It was also a pleasure to welcome Sir William Nottidge, Chairman of the Kent County Council, and Mr. E. P. Capey, manager of the Maidstone Branch of the National Provincial Bank. After lunch the Director reported to the Governing Members on the history of our buildings and, in particular, of the extensions that had now been completed, and expressed the thanks of all to those who had made them possible, not forgetting the members of the research, administrative, and farm staff who had contributed their share.

So many times in these Annual Reports since the war have we commented on the over-crowding in our laboratories, and the efforts that were being made to overcome the difficulties, that it is pleasant now to quote from the Director's report: "The final result is that the laboratory buildings now accommodate 45 S.O. class, 35 E.O. class and 55 Assistants—a total of 135—with much improved facilities for their work and for the acceptance of postgraduate students." Truly, as Captain Wellington, our first Director, has said, "both a very great aid and a very great challenge to the future achievements of the research at East Malling." We must not forget the challenge.

THE TRUSTEES

We regret to report the resignation during the past year of General Sir Ivor Maxse. He has been a Trustee since 1927, the three then appointed being Lord Selborne, the late Sir Bernard Greenwell and himself. General Maxse is a very old friend to many at the Station, having, in addition, represented West Sussex on the Governing Body from 1935-48. His friends were sorry to learn of his illness later in the year.

The Trustees met in April, 1955, under the Chairmanship of Lord Selborne and we are glad to record that Lord Cornwallis, Lord Lieutenant of Kent, and Lord Adrian, then President of the Royal Society, accepted invitations to succeed General Maxse and the late Mr. George Monro, whose death we reported in 1951.

COMMITTEES

The quarterly meetings of the Executive Committee and Finance Sub-Committee were held as usual. At these meetings, all the business of the Station is discussed, some of the more important items of which follow.

The Farming Sub-Committee met on 3rd June and elected Mr. Owen English as Chairman. Some of the matters discussed and reported to the Executive Committee later are detailed below. The Plant Prices Sub-Committee, of which Mr. W. Talbot Edmonds has been Chairman for many years, also met in London to consider surplus material available for Members, and prices (see *Distribution of Experimental Material*, p. 28). The Building Sub-Committee did not meet but, in May, Mr. J. F. Towner, its Chairman, made his sixth annual survey of all Station properties, on which the work of the maintenance team is planned for ensuing years. The Committee would like to take this opportunity of expressing their gratitude to Mr. Towner and also to other members of the various sub-committees who devote their time to the Station's affairs, quite apart from their attendance at meetings.

Buildings

Last year we reported, a little in advance, the completion of the Laboratory Extensions, which has already been alluded to in the account of the Governing Members' Luncheon (p. 11). Writing rather late this year it is difficult for us to realize how recently these extensions were completed, since the staff seem to have grown into their more spacious surroundings so rapidly. The Committee would emphasize two points in this connection. Firstly, they would record their pleasure that the building operations extending over three crowded years have been accomplished with no visible disruption in research effort. Secondly, the fact that the staff now have adequate accommodation for the first time for many years does *not* mean in any way that they have become more "laboratory minded". There are very few members of the research staff, if any, and we cannot call any to mind as we write, be they botanists, chemists, physiologists, pathologists or statisticians, who have not their main interest in experiments outdoors in the

plantations. The Station started in 1912 as a centre for experimentation on fruit plants growing in the field and it remains so today.

With the completion of the main buildings, there have been some additions. We now have a special room for drying plant material, and there is also a room near the buildings where members of staff can keep their gumboots and avoid bringing mud into the buildings. Outside cloakroom accommodation has also been improved. Apart from electrical installations, these works were done by our own staff. The workshops have been re-organized and more room provided, and they are much better heated than they used to be. Sheds have also been built in which to keep the various vehicles we now have.

On the north side of the Manwaring Building a glazed laboratory, for insect rearing and studies of the interaction of insect, plant and insecticide by the Plant Protective Chemistry Section, has been erected and the Plant Pathology Section have a field hut on Upper Grub.

Last year we reported that four small fruit stores, each to hold 750 bushels, had been built and would be used in the winter, 1954-55. In the spring, the installation of scrubber apparatus was completed so that they are now in use for gas storage.

Some attention has also been paid to the packing shed, screens having been erected, not only so that the women can grade and pack the fruit in greater comfort, but also to make the building more suitable for meetings of Members on occasion. One of these days, perhaps, we shall have a conference hall; until then we must make the best use of the space we have.

The work at Bradbourne has gone steadily ahead, as and when members of the maintenance staff could be spared from more urgent tasks. Gradually, the interior walls that we could not touch in 1939 are being strengthened and the house made safe for posterity. At the same time, decorations, probably untouched for a hundred years, are being renewed. Again, we must thank the staff of the Bureau, the Library and the Office for carrying on with no interruptions to their work.

Land and Farm Policy

The Kent County Council played a big part in the establishment of the Station and ever since, the friendliest relations have been maintained between us. This year, they have given further proof of their interest by the conveyance of Great East Field—the original twenty-acre Wye College Experiment Station—to the Station for the nominal sum of one shilling. This field was originally bought by the County Council and has been hitherto leased to us at a peppercorn rent. We would add that it is Captain R. Wellington, the first Director, who has paid the purchase price for this historic field on which so much has been accomplished. We are now fortunate to be the owners of all the land occupied by the experimental farm.

We have often told Members how restricted we now are for additional experimental land, and no further opportunity has yet come to add to it. We have, therefore, to make the best use of our present limited acreage. We now have no land suitable for fruit plantings that has not already borne fruit, and during the next few years, only some thirty-four acres will have been rested long enough to come into use again.

The measures, suggested by the Farming Sub-Committee, for shortening the long resting period are being tried out. At present we feel bound to insist on a long resting period before the land can again be considered sufficiently uniform and in good heart for replanting. Pending further information this Sub-Committee has given its attention to making the use of the land we have as profitable as possible. Much of it is already earmarked for particular experiments, but there has seemed a need to provide areas of

fruit which, when established, can be used for various experimental purposes, some of which cannot now be even foreseen. Further, there is a need to restore the balance of our fruit plantings, now heavily weighted in favour of apples. To this end, about an acre of raspberries was planted in 1955-56, and this will be followed next season with two acres of black currants and some three acres of pears. We hope, later, to add two acres of plums.

In addition to advising on the policy for cropping the arable part of the farm, the Sub-Committee have approved a three-year programme for additions to and replacement of farm machinery. Visitors to the packing shed will note the disappearance of the old Cutler grader of which we were so proud when it was first installed and brought into use under the eagle-eye of Mr. A. C. Painter twenty years ago. The new Ardee grader has been installed and is giving satisfactory service in its first season.

Sectional Re-organization

The Staff List in the Report details the personnel in the various Sections as re-organized from 1st October, 1955, consequent on Dr. W. A. Roach reaching the retiring age, and, in the section on Staff, mention is also made of these changes. While the re-organization did not come strictly within the year under review, much thought has gone into the new arrangements, and the accommodation of the members of staff concerned, during the past year. Next year the Research Report will give some account of the work now allocated to the new and smaller Biochemistry Section, the Fruit Nutrition Section and the Plant Analysis Section. The Committee are gratified that Dr. Roach himself is still with us.

The Grange and the Canteen

Previous reports have given much space to these two institutions that are now part of our lives. Nevertheless, the former has given much anxiety during the year since, while the rents charged covered the day to day cost of running the Grange, the furnishings and amenities have been gradually deteriorating and no funds from the Grange itself have been forthcoming to put matters right. At the end of the year, the Committee, after ascertaining the views of the staff, decided that the Grange is such an asset to the Station that it must be maintained and, if we may anticipate, agreed to make a special grant towards improving the furnishings and amenities. So, once more, the Association is providing the means whereby an essential asset to the smooth running of the Station and the good of the staff is kept going.

The Canteen, under the genial management of Miss Booth, has not only been able to keep up a very high standard in its meals served but has succeeded in making a sufficient profit to pay for needed replacements and additions to the facilities in the kitchen. Five years ago the Canteen accounts showed a deficit of about £125. Since then, despite constantly increasing costs, it has not only paid its way, but has paid off the deficit and put by a reserve fund of £150 for emergencies. The Committee feel that, bearing in mind that there are no complaints of poor meals or overcharging, this is a notable achievement.

Index to Annual Reports

Older Members of the Association may not wish to be reminded that this Report is numbered A.39. Looking back to A.2 the Report for 1920, there are now no names in the Staff List that were then included, though we are glad to say that one or two who were here in those days are still with us. Nevertheless, in the years that have elapsed since the first field experiments were planted here, much research has been accomplished, the results of most of which have been set out in these Reports. As the older members

experimental farm. In the meantime the Committee would congratulate Mr. Villiers and the farm staff on their achievement in reducing costs without in any way impairing the research in progress.

EXPERIMENTAL FARM ACCOUNT

1st October, 1954, to 30th September, 1955

EXPENDITURE			INCOME		
	£	s. d.		£	s. d.
Farm Wages	32,355	1 9	Sale of Produce and Crops ..	28,125	16 1
Farm Manures and Sprays ..	3,237	4 5	Sale of Livestock	2,425	15 10
Livestock	1,737	13 8	Sundry Receipts	241	11 0
General Farm Expenses, Imple- ments and Repairs	17,361	13 5	Balance being excess of Expen- diture over Income	23,898	10 4
	<u>£54,691</u>	<u>13 3</u>		<u>£54,691</u>	<u>13 3</u>

THE EAST MALLING RESEARCH STATION ASSOCIATION

The Association may in many ways be considered the backbone of the Station. It is only with the support and interest of fruit growers that our research can go forward uninterrupted. The Committee are disappointed, therefore, that the Membership of the Association is still below 2,000. It is true that, at 1,940, there is a slight increase on last year, but this is not good enough and too many fruit growers today are still unaware of the advantages of a close association with those who are working for their benefit, to which Membership provides the key.

This Section of the Report details the finances of the Association and shows the year's contribution to research, the much appreciated grant for staff amenities and, in the Balance Sheet, the amounts expended on properties to help with the housing of the staff.

The Committee would impress on Members, however, that, much as these services are appreciated, the amounts contributed are not nearly as important as the moral encouragement that a strong and flourishing Association gives to the research staff and all those that have the interests of horticultural science at heart. They would, therefore, once more urge Members to do all they can to persuade fellow growers to join their ranks, come to the Station when they can (and there are plenty of opportunities) and get to know the men and women who are trying to solve their problems.

THE EAST MALLING RESEARCH STATION ASSOCIATION INCOME AND EXPENDITURE ACCOUNT

1st October, 1954, to 30th September, 1955

EXPENDITURE			INCOME		
	£	s. d.		£	s. d.
Research Grant	1,321	0 0	Subscriptions and Donations	4,048	11 9
Evening Class Fees	5	10 0	Miscellaneous Receipts	10	5 7
General Expenses	1,379	13 10	Interest on Investments	153	0 0
Staff Amenities	175	0 0	„ „ Loan	19	2 6
Surplus	1,459	5 7	Property Accounts—		
			Rents received	296	0 4
			Less repairs, etc.	186	10 9
				<u>109</u>	<u>9 7</u>
	<u>£4,340</u>	<u>9 5</u>		<u>£4,340</u>	<u>9 5</u>

THE EAST MALLING RESEARCH STATION ASSOCIATION BALANCE SHEET

at 30th September, 1955

	£	s.	d.		£	s.	d.		£	s.	d.
<i>Accumulated Member's Fund :</i>					<i>Freehold Property at Cost :</i>						
As at 30th September, 1954 ..	19,228	11	8		" Fircroft "	2,577	16	5			
Add Surplus for the year ..	1,459	5	7		" Grange "	6,214	17	2			
					31 Buckland Lane	2,567	1	2			
					59 Grace Avenue	2,299	6	0			
	20,687	17	3		75 Grace Avenue	2,854	17	4			
									16,513	18	1
<i>Liabilities :</i>					<i>Investments at Cost :</i>						
Pension provision	250	0	0		£2,000 3% Funding						
Less Spent ..	12	7	6		Stock, 1966-68	2,000	0	0			
					£3,720 11s. 2d.						
Bank Overdraft	..	..	800	7	2½% Consols	3,000	0	0			
Sundry Creditors	..	..	158	9	6						
					(Valuation 30th September						
					1955, £3,715)	..	..	5,000	0	0	
					Loan Account ..	..	..	360	0	0	
					Sundry Debtors	..	..	10	9	1	
	£21,884	7	2						£21,884	7	2

MEMBERS' DAYS

Four days for Members and Associates were held, with a total attendance of 750.

The Members' Day on 25th November, 1954, was arranged to precede the Amos Memorial Lecture held in the afternoon. The time was spent in seeing the various investigations on pruning, especially of apples, and in discussing the results of the treatments on growth and cropping, under different soil conditions. The opportunity was taken to demonstrate also the long-term effects of frameworking and top-grafting Newton Wonder apple trees.

On 1st February, 1955, Cox's Orange Pippins from a cold storage experiment with commercially grown fruit were shown. These apples were collected from Members in various parts of the country to provide information on the effects of the growing conditions on storage life. The results of the experiment were discussed during the afternoon but it was clear that it would be unwise to draw any conclusions from the behaviour of the fruit in one season.

The production of virus-free strawberry runners formed the subject of the Members' Day on 22nd June, 1955. All stages were demonstrated, including testing for virus disease, insect vector control, virus inactivation by heat treatment, protected propagation of selected clones and their field testing for growth, cropping and quality. In addition cultural trials with spacing, manurial, and irrigation treatments were shown.

The part played by beneficial insects in the control of pests was discussed on 21st September, 1955. Attention was focussed on two field trials where restricted spray programmes are being carried out for a period of years and where close observations are being maintained on both pests and predators. Talks were given on the various beneficial species, and specimens of them were exhibited.

Special summarized reports of all these days were prepared and sent to each Member and Associate. We believe that these reports are found to be helpful, judging by the comments on them that we have received.

AMOS MEMORIAL LECTURE

The seventh lecture of this series was delivered to an audience of almost 400 by Professor T. A. Bennet-Clark at the Research Station on 25th November 1954. His subject was "Water and plant growth", and he dealt chiefly with water absorption from the soil and the channels for its transport within the plant. He showed how recent research had cast serious doubts on the truth of classical concepts of water movement and made a plea for further research on this subject with perennial woody plants.

STAFF

As from 1st October 1955, following the retirement of Dr. Roach from his post as Head of the Biochemistry Section, some reorganization has occurred. Dr. Roach himself will now undertake the special task of reviewing the extensive literature on plant injection and will carry out further studies on its application to the problems of determining the mineral status of fruit plants. Three new Sections are being formed, a much smaller Biochemistry Section with Dr. A. E. Flood as its Head, a Fruit Nutrition Section under Dr. D. W. P. Greenham, and a Plant Analysis Section under Mr. A. C. Mason.

As these changes properly relate to the year 1955-56, no further comment upon them will be made now. In order to avoid confusion, however, the Staff List at the beginning of this Report includes only those members of staff who were here on the 1st October 1955, and is arranged under Sections as reorganized from that date.

In considering the staff changes during 1954-55 as a whole, it is pleasant to notice that three of those appointed during the period first came to the Station as temporary recorders during their University vacations. There are also on the staff at the time of writing four who served their apprenticeship here as plantation assistants.

In the Pomology Section, Mr. G. C. White was appointed in December 1954 to assist with studies on the relation of tree behaviour to orchard soils and their management. In May, Mr. G. A. Booth joined the Section to help with the development of the rootstock investigations. The marriage of Miss J. M. Paton was recorded last year; Mrs. Ariel, as she now is, resigned in December and was succeeded by Miss M. G. Fromow.

In February 1955, the Royal Horticultural Society awarded the Silver Gilt Lindley Medal, the Society's highest award in the class, to an exhibit of Tydeman's Late Orange apple staged at the Spring Show. This variety, one of those resulting from Mr. H. M. Tydeman's long-term breeding programme, was described in the Annual Report for 1948 and first offered to Members in 1949. This year virus-tested trees have been issued under the Station's mother-tree scheme.

In September, Miss B. Mosse left for Australia, whence, after a period of special leave, she will proceed to California to study plant anatomy and microbiology with the assistance of the award of a Kellogg Foundation Fellowship. She is expected to be away for a year.

Miss M. J. Hall resigned her post in the Statistics Section in March, in order to seek other employment in Canada. In September, Mr. A. H. F. Brown joined the Section to continue studies on variation and measurement of fruit trees.

Mr. H. W. B. Barlow was appointed Head of the Physiology Section as from October 1955. Following Dr. Vyvyan's retirement he had been deputy Head of the Section for two years under Dr. Tubbs. Of the Imperial College staff, Dr. H. C. Ruck, who had been working with Dr. Bolas since 1949, was seconded to the Department of Agriculture, Cyprus, for two years as from September 1955.

Dr. F. H. Vanstone, physicist since 1946, has now taken up a new post with the National Institute of Agricultural Engineering; all his many friends wish him well.

Miss M. E. Bunyard, who comes of a very famous horticultural family, has fulfilled a rather special place in the Biochemistry Section since she joined the staff in April 1944. Not only has she looked after the clerical side, particularly when during the war the mineral deficiencies team were working in different parts of the country, but has undertaken many other duties as well. The Station also has cause to be grateful to her for unselfish voluntary services to the Canteen and to the Garden Club. We all wish her well in her retirement. Mr. J. F. Bates resigned his post in February and, if we may anticipate by a few days, he was succeeded in October 1955 by Mr. A. B. Whitfield who will carry on the work of microchemical analysis in the new Plant Analysis Section.

In the Report for 1949 we recorded that Dr. A. F. Posnette had been seconded from the Colonial Service to take up work on virus diseases, particularly of tree fruits, in the Plant Pathology Section. Since that time it is hardly an exaggeration to say that his investigations have profoundly affected the work of every Section. We are glad to report that, as from April 1955, he has been transferred permanently to the Station Staff. Last year we reported the transfer, owing to ill health, of Dr. F. W. Andrews from the Plant Pathology Section to other work. In November, Mr. G. W. F. Sewell was appointed to the vacancy to carry on the work on fungal pathogens of fruit and hops, with special reference to soil-borne diseases. Shortly after his arrival, Mr. Sewell was awarded a Ph.D. degree by London University for a thesis on his previous work on the fungal ecology of *Calluna* soils. In March, Miss S. E. Ball was appointed to the Section to assist with field records on pathology trials.

In April 1954, to the pleasure of their many friends, Mr. F. W. M. Llewelyn, of the Imperial College staff working with the Plant Physiology Section, and Miss J. R. Groves of the Entomology Section were married. Mrs. Llewelyn, however, stayed on until January 1955, when she had completed seven years in the Entomology Section. The first part of this time was spent at the Field Laboratory at Great Braxted, Essex, working on the biology of the Fruit Tree Red Spider Mite. She will be well remembered by our collaborators in the A.R.C.-Pettar-ACE investigations, who we know will join us in wishing them both every happiness. Mrs. Llewelyn was succeeded by Mr. J. R. Chiswell at the end of September; he will work on the fruit Tortricid moths, the Codling Moth, and the froghoppers and leafhoppers associated with fruits.

Miss W. M. Phillips of the Plant Protective Chemistry Section resigned her post in December 1954 on her marriage to Mr. D. W. Way, who spent a year of his Royal Horticultural Society's scholarship with us. Our good wishes go with them both. Miss Phillips was succeeded by Miss J. M. Sillibourne in September 1955.

Last year we alluded to the Fruit Storage Investigations, in which Dr. Montgomery is collaborating with the staff of the Ditton Laboratory. In April, Mr. K. F. Hobling resigned his post and, in the following month, Mr. M. A. Perring was transferred to the Department of Scientific and Industrial Research. In August, Miss S. M. Morrissey came to us from Bedford College as botanist to assist Dr. Montgomery in his share of this work, mainly the assessment of orchard factors relating to storage quality.

In former times it was possible to mention Assistants (Scientific) individually in these notes. As there are now fifty-three in the Staff List, of whom fifteen were appointed during the year, this is now impossible. The names of those who were on the staff on the 1st October, are included in the List (pp. 5-9). Twelve have resigned for various reasons and we wish them success in their new occupations.

Again, we are glad to report no changes in the senior Administrative Staff. We should, however, record the resignation on her marriage of Miss I. Cross, who first came to the Station as assistant personal secretary to the Director in 1946 and was subsequently

secretary to Mr. Hoblyn ; in the latter capacity she was succeeded by Miss J. C. Irving, formerly of the Scientific Liaison Section.

We note the addition of two names to those of our Farm Staff who have twenty-five years service, or more, J. A. Brooker and F. J. Page, and the resignation of J. Tanner after thirty-four years' service. We sometimes wish that more of those appointed in recent years would show signs of settling down as well. The experience of these long service farm workers is of immense value to the research in progress on the experimental farm.

There have been no changes in the scientific staff of the Bureau.

Though subsequent to the period of this Report, we must record with great regret the death of Dr. H. Wormald who, following his retirement from the Station Staff in 1945, assisted in the work of the Bureau for another six and a half years. An account of his life work as a plant pathologist will be found in the Research Report.

It is not just a matter of form that we usually conclude this section with a word of thanks to those who serve on the various internal standing committees, particularly their officers. Their work is greatly appreciated and much of the smooth running of such departments as the Library, the Workshops and the Canteen are due to their efforts. Mr. J. T. Legg is now Chairman of the Canteen Committee.

Organized Visits

This year the Forestry Commission Research Station, Alice Holt Lodge, Farnham, Surrey, was visited. The party of some sixty members of staff was welcomed by Mr. M. V. Laurie, Chief Research Officer, and then divided into three smaller groups to visit the Seed Testing Laboratory, the Entomology Section, and the Forest Census and Mensuration Section before lunching in the staff canteen. The afternoon was spent in the field seeing something of the work of the Propagation, Forest Pathology, and Genetics Sections.

Three farm visits were arranged during the summer. The first was devoted to soft fruit, especially strawberries and raspberries. It began at Mr. R. Vinson's farm at Faversham, where the party not only saw some well-grown soft fruit, but also obtained an insight into the planning and organization needed to fit together the various cultural operations, especially fruit picking, on a wide range of top and soft fruits. As a contrast to this Mr. S. J. Fermor's specialist farm at Ulcombe was of great interest. Here on a small acreage all the operations are designed to produce high quality strawberries, and other crops are grown solely to provide a rotation to maintain high fertility. The day concluded with a visit to Mr. J. A. Worley's Manor Farm, Harrietsham, where strawberries on a really large scale provide a major part of the farm income. Successive plantings of Climax showing varying degrees of " yellows " were of special interest.

The second day was spent around Brenchley and Horsmonden, beginning with Mr. R. D. Webb's farm Tawsden, Brenchley. Here the party was rapidly taken over a considerable acreage, mainly of apples, and saw how the best use was being made of a range of soils and situations ; this included the grubbing of copses and woodlands, with subsequent planting to fruit. The heavy crops of completely scab-free apples caused much comment. A visit to Messrs. Norman Hunt and Sons' farm at Brenchley followed. Here on a somewhat smaller scale we saw the specialist production and marketing of apples. After lunch we visited Bassett's Farm at Horsmonden, with Mr. Basil Furneaux to assist Captain Ralling in dealing with explanations and questions. Here on a soil chosen for the purpose by an expert, apples were being beautifully grown. Few farms can be as well equipped with tractors and spray machines to ensure that treatments are

applied at the right time, and this efficient planning of all operations appears fully justified in the very heavy, regular crops of apples produced. From here we passed over the road to Mr. C. R. Favell's farm at Cardinals, Lewes Heath Orchards, and were impressed by the excellent fruit being grown on poor soils with rather unorthodox treatments.

The final visit of the season was to the Kirdford Growers. The party was welcomed by Mr. Bill Fowle, who described some of the problems that had to be overcome when growing fruit in that area. The party then made a tour of his farm and later of Little Slifehurst Farm and Laneland Farm under the guidance of Mr. J. R. H. Napier, and Mr. M. Ashbolt (for Messrs. J. Salbstein Ltd.). The heavy crops and brilliant colours of the Worcester Pearmain and Cox's Orange Pippins were noteworthy, but the problems of shallow soil and impeded drainage provided much food for thought and discussion. A tour of the packing shed and stores followed and after tea, before the party left, Mr. Peter Mursell gave a short talk dealing with the unique organization of Kirdford Growers. Mr. Peter Hamer, technical officer of the group, arranged the programme and dealt with many of the questions raised during the tour.

We wish to thank all these growers for so warmly receiving us on their farms and giving us their individual attention to ensure that we got the most information from our visit. We would also thank Mr. W. G. Kent for his assistance in planning the visits and for accompanying us on them. These visits to growers' farms have now become a regular feature of the summer and are of very great value in ensuring that specialist research workers are familiar with the day to day problems of the practical fruit grower.

Social and Athletic Activities

This section of the Report, though perhaps of main interest to the staff, should interest Members, as it is with the assistance of their annual grants that most of the clubs have been started and equipped, while many activities owe much of their success to the support received from these sources. Two clubs now organize an annual match against teams of Members and we hope that others will follow their example. We should particularly like to see the ladies compete in a netball match—athletic ladies in the Association please note!

Mr. A. C. Mason continued to act as Social Secretary during the year and organized the main events. The Christmas Party was held at Bradbourne on the 20th and 21st December and once more Miss Seymour was responsible for welding the rather mixed assortment of talent into a coherent entertainment. The last Saturday in July seems to have been an exceptionally fortunate choice in the last few years as the date of the Children's Party at Bradbourne, being again graced with that fine weather which makes all the difference. Two ballroom dances were arranged in November and July, the latter being a special benefit night for the Netball Club.

We have not hitherto mentioned the annual service in East Malling Church which has now become a part of our pre-Christmas celebrations. There, many members of staff with their families gather each year to sing carols and listen to the story of the Nativity told in the nine lessons.

A new outlet for the energies of members of staff appeared this year following on the discovery of part of the foundations of a Roman farmhouse in the garden of the Grange. Most of the building seems to lie outside our property; nevertheless, for much of the summer, teams of excavators were engaged in uncovering this ancient building, the existence of which had long been suspected, and many interesting finds were made. Some of them were recorded by members of the Photographic Club.

The Ladies' Netball Club should undoubtedly be mentioned first among the athletic clubs during the past season. With fifteen playing members they played seventeen matches, winning thirteen of them, and tied for second place in the Medway Towns Netball League.

All the other clubs report enjoyable seasons though they were perhaps not quite so successful in their matches. The most encouraging sign is one of generally increased membership, though, possibly because of the rival attraction of netball, fewer ladies played hockey. Nevertheless, the number of members of the Tennis Club jumped from twenty-two to forty-two, making necessary an additional "Club night" each week. The Cricket Club beat the Members XI, only the second time on record, by nine wickets. The Hockey Club on the other hand had to admit defeat, though we hope that they made up for it afterwards in accordance with the inviolable custom set up by those who play cricket. If the Table Tennis Club did not win many matches, there was a regular attendance on Club evenings in the Canteen, and lunch hour play in the packing shed continued throughout the summer.

The dry season was undoubtedly to blame for the lower standard of produce at the Garden Club's Annual Show in September, though this did not apply to the fruit. We congratulate Mr. Painter on winning both the Fruit and the William Rogers Challenge Cups. Ten "Little Shows" maintained interest throughout the year.

Of the social clubs, the Music Club had one "live" and six gramophone concerts, and organized an excursion to the Royal Festival Hall. The Play Reading Society read thirteen plays ranging from historical and straight to downright thrillers and farces.

Much of the success of various clubs that contribute so much to the recreation of those who work at the Station depends on the efforts of the secretaries, and the staff as a whole should be grateful to them. While we are delighted to see new names among those who take on these spare time jobs it is noticeable that there are some who have been doing it for years. Perhaps it is not out of place to record that in December 1955, Miss B. Seymour produced her 9th Christmas entertainment.

POSTGRADUATE STUDENTS

It was encouraging for those members of staff who attended the Horticultural Congress at Scheveningen in September to meet there no less than fourteen former post-graduate students or visiting research workers who had worked at the Station. Many of these now occupy highly responsible positions in their own countries. Nevertheless, we are bound to record that the present position, as commented upon last year, has not improved and we have now very few long-term students registered for higher degrees with London University, other than members of the research staff.

Candidates for Higher Degrees and other Long-term Students

Of the fifteen postgraduates studying for higher degrees with London University during the year, there were thirteen members of staff and two students from abroad.

Mr. J. E. Crosse of the Plant Pathology Section was awarded a Ph.D. degree in January for a thesis entitled "Studies in bacterial diseases of cultivated *Prunus* species"; and, in June, Mr. D. S. Kirkham, of the same Section, was awarded a Ph.D. degree for a thesis entitled "Studies in the reactions of certain parasitic *Venturia* species in artificial culture and *in vivo*". We congratulate them both.

The two candidates for Ph.D. degrees from Canada (Entomology Section) and New Zealand (Pomology Section) are likely to complete their studies in the near future.

Mr. Shambhu Man Singh remained with us for a second year, during which he

visited other horticultural research institutes in this country, and we may now add that at the end of the year he returned to Nepal with the good wishes of us all. In March, Mr. M. B. Georgala, of the Fruit Research Station, Stellenbosch, South Africa, arrived to spend a year working in the Entomology Section and, in September, Dr. N. W. Frazier of the Department of Entomology and Parasitology, Berkeley, California, arrived to spend approximately a year's "sabbatical leave" with us. He will be associated both with the Entomology and Pathology Sections, being particularly interested in insect vectors of strawberry virus diseases.

Short-term Students

Mr. S. Paunovic of Yugoslavia, whom we mentioned in the last Report, stayed for a further four months. Also in the Pomology Section, we welcomed Professors F. Scaramuzzi and E. Baldini, both of the Università di Firenze, Italy, for periods of five and three months. Mr. J. N. R. Jeffers of the Alice Holt Forestry Research Station spent two months working with the Statistics Section, and Dr. L. N. Posener, lecturer in statistics at the Hebrew University of Jerusalem, worked with them for six weeks later in the year. Mr. M. M. Jordovic of the Plant Protection Station, Cačak, Yugoslavia, with the assistance of a fellowship from F.A.O., worked for six months in the Plant Pathology Section from May to October studying tree-fruit viruses, those of plums in particular; and Mons. M. Morvan of the Station Centrale de Pathologie Végétale, worked in the same Section for a similar purpose for six weeks from July. Also in the same month Mr. J. M. Thresh of Nigeria (formerly a temporary recorder) spent three weeks with the virus diseases group.

It will be noted that several of those mentioned above are experienced research workers and they are only grouped in this section for convenience. If they come here primarily to study our research methods, they give us in return the benefit of their own experience which we value very much.

TEMPORARY RECORDERS

The scheme whereby we are able to give experience of field experimentation to a limited number of students at Universities in the United Kingdom during vacation periods is now becoming familiar to Heads of Departments at Colleges and Universities, and we are particularly grateful to them for sending us only worthwhile students and telling us frankly what they think about them. There were not quite so many applicants this year, though the deficiency was mainly for work in the Pomology Section. This is probably because of a lack of appreciation by students that, except in a few special instances, the work of recording field experiments is not so very different, though the subjects of research obviously vary, in different Sections.

This year we were able to fill sixteen vacancies in the Pomology and Plant Pathology records groups and in the Plant Physiology and Entomology Sections. These came from the Universities of London, Bristol, Reading, Wales, Durham, Dublin and Leicester.

These extra pairs of hands are very useful to us at busy seasons and we hope that those who come return to their studies with an appreciation of what experiments in the field on perennial crops are really like.

PLANTATION ASSISTANTS

Once again we can report a full and enthusiastic team of twelve plantation assistants, this year three girls and nine men.

In the second year of the award, the annual medal and prize offered by the Worshipful Company of Fruiterers was won by Mr. John F. Thompson. We congratulate him on

the good use he has made of his time as a plantation assistant, during which he has also passed his N.D.H. Intermediate examination. He has now joined the staff of the Plant Protective Chemistry Section.

That the plantation assistants do not spend their entire time on the farm or attending lectures given by members of staff—this year supplemented by Mr. W. G. Kent and Mr. O. G. Dorey—is shown by the programme of visits during the year. This year they went to Long Ashton, Brogdale, Woodstock, Borden and to the Kent Horticultural Institute at Swanley. These were, however, only interludes in their main work on the innumerable field experiments in progress on the farm.

Former assistants who read this necessarily brief Report are reminded that we are always glad to have news of them after they have left, and that they will be warmly welcomed when they come to visit us.

STAFF DISCUSSIONS

During the winter months, as usual, the staff gathered together to discuss research problems, and six such meetings were arranged. Last year we reported on the memorandum of the problems of the apple growing industry prepared for the A.R.C. by the Director, and one of the more stimulating discussions of the year was based on that report. Another highlight was an account of the work of his department, in which we are collaborating, given by Professor R. D. Preston of Leeds University. Canadian research, particularly on entomology, was the subject of a discussion opened by Dr. Dicker and Dr. Kirby who had recently returned from their Canadian tour, some aspects of which were described in last year's Research Report. On other afternoons, the purpose behind field experiments, the mechanism of rootstock effect, and viruses were the subjects for discussion.

RESEARCH TOURS

Most of the visits abroad in 1955 were for the purpose of attending congresses or conferences and are mentioned on p 26. Visits were made to a number of institutes in the course of congress tours.

With the assistance of a grant from the A.R.C., Mr. A. P. Preston made a tour of stations in Western Europe where pomological research is in progress, particularly the study of fruit tree rootstocks. In the course of his tour he visited Gembloux in Belgium, Wilhelminadorp and Wageningen in Holland, Bonn and Jork in Germany, Blangstedgaard, Denmark, and Alnarp, Sweden.

Dr. R. V. Harris and Dr. A. F. Posnette spent some time in Holland in connection with a symposium on virus diseases of fruit trees in Europe, held at Wageningen, prior to the Congress at Scheveningen.

While he was in India, Dr. S. C. Pearce visited the Research Station at Saharanpur, the Director of which Dr. L. B. Singh, is a former postgraduate student. Later, in Brazil, he visited the Agronomic Institute at Campinas, the Agricultural College at Piracicaba and the Citrus Research Station at Limeira.

Visits to other research centres and experiment stations at home are so numerous that we cannot mention them all here; we would note, however, how much we value the interchange of ideas and discussions with fellow research workers in different parts of the country that are thereby made possible.

COLLABORATION

We would start this section with an excellent example of the way in which research institutes are collaborating with the N.A.A.S. for the quicker solution of a particular

problem. In the autumn of 1953, an acre of Royal Sovereign strawberries was planted at the Luddington Experimental Horticulture Station, with the blessing of the Fruit Working Party, for "future pathology trials". In the spring of 1955, it was decided to use this for a trial on the control of *Botrytis* rot (Grey Mould). The trial was jointly sponsored by Long Ashton and East Malling, and, from this Station, the Plant Pathology, Pomology and Plant Protective Chemistry Sections all assisted in drawing up the project, while the Statistics Section prepared the plan for the trial. During the summer, research workers from Long Ashton and East Malling went to Luddington to assist the recording staff of that Station in making the necessary observations on the fruit and to help with the despatch of samples to Long Ashton for processing and examination for taint. Incidentally, all the information available, on which the design of this trial was based, was brought together in three papers published in the *Journal of Horticultural Science* in October 1955. The investigations will be continued in 1956. Such pooling of knowledge together with facilities offered by the Experimental Horticulture Stations can only be beneficial.

This is only one example of what is now going on all over the country ; we have mentioned others in previous years, many of which are continuing. One, we noted particularly last year, was the investigation on the effect of orchard factors on storage quality, particularly *Gloeosporium* rots of Cox's Orange Pippin, in which Ditton Laboratory, Long Ashton and we ourselves are participating, to say nothing of a large number of growers. We would note, in this connection, that Mr. E. J. Guthrie of the Botany Department, Imperial College of Science, assisted for three months in a spraying trial at Horsmonden.

One of the more interesting and potentially productive instances of joint research was initiated in 1955 in collaboration with Professor R. D. Preston of the Department of Botany, Leeds University, on the structural changes in the cell wall, particularly those associated with the development of apple fruits under different orchard conditions, and with apple varieties with and without obvious symptoms of rubbery wood virus. With the aid of a grant from the A.R.C., an assistant has now been appointed under Professor Preston to enable these studies to be continued in collaboration with the Station.

Most other collaborative investigations have been recorded in previous years, but we should report a few that are new this season. Thus, in connection with pathogenicity tests of isolates from suspected outbreaks of Progressive *Verticillium* Wilt of hops, our Plant Pathology Section assisted Dr. Glasscock in the design and installation of a range of concrete testing trenches (similar to our own) at the Efford Experimental Horticulture Station.

The Entomology Section is indebted to the Ditton Laboratory for facilities for storage of apple leaves and twigs for insect-rearing purposes, and to Dr. G. Salt of Cambridge University for providing caterpillars for research on parasites. The Statistics Section have among other matters advised East Kent Packers Ltd., on sampling techniques for the provision of information on storage matters. Although the dividing line is by no means a clear one, other outside activities are more properly grouped in the next section. We continue to provide fruit for processing work at various institutes ; this year samples of plum varieties were sent to Aberdeen for drying tests.

OUTSIDE TRIALS

Facilities for trials outside the Station exist now both at N.A.A.S. Experimental Horticulture Stations and on growers' farms. Some of the trials are initiated by ourselves, as a direct extension of our research programme, others are collaborative ; some-

times our function is merely to give advice on the general design and detailed planning of the experiment. In almost all cases, at some time or other, we are working in close touch with the N.A.A.S. The full list of outside trials in which we have an interest is now a formidable one and there is only space here to pick out a few that are new. Among these are trials of methods of blossom thinning and of defoliation in Essex and Sussex in which several of our research staff joined. The Biochemistry Section report a spraying trial with Iron-EDTA at Aylesford. The Plant Pathology Section have many outside interests, notably in connection with concentrate spraying of apples and with hop research particularly, of course, *Verticillium* Wilt. This year three new trials in Kent were started in connection with Hop Nettlehead. The Entomology and Plant Protective Chemistry Sections still have interests in Essex connected with work on the Fruit Tree Red Spider Mite. A trial at Luddington on the control of Red Spider Mite on black currants has not been mentioned previously; finally growers in Kent have provided soil and root inoculum for pot experiments on root lesion nematodes.

To all those who work with us or make such trials possible, whether they be advisory officers or growers, we once again say thank you.

SCIENTIFIC SOCIETIES AND CONFERENCES

The Director and five members of staff attended the XIV International Horticultural Congress in Scheveningen, Holland, at which Dr. F. R. Tubbs gave a "General Lecture" on the control of vegetative growth and reproduction of perennial plants, and Dr. R. V. Harris read a paper on the production of virus-free plants in the symposium on "The distribution of virus-free plant-material". The Chair for the symposium on "Propagation" was taken by Mr. R. J. Garner, who also contributed a paper on propagation by hard-wood cuttings to this symposium, and another on double-shield budding in a sectional session.

Dr. S. C. Pearce attended the Biometrics Symposium at Campinas, Brazil, and delivered a paper entitled "The specific problems of experimental design and technique in perennial crops", to open the session on perennial plants. While in India under the auspices of F.A.O., Dr. Pearce attended the eighth annual meeting of the Indian Society of Agricultural Statistics, taking the Chair at one session and delivering a paper on plot size in experiments with trees and bushes at another; he also gave a talk on experimentation in Western Europe in a symposium on the status of experimentation. He addressed two meetings of the Statistics seminar of the Indian Council of Agricultural Research, his subjects being the changing of treatments in a long-term experiment, and the design of manurial trials with trees. Another paper on plot size in experiments with trees and bushes was read at the Biometry seminar at Oxford.

At Wageningen, Holland, Dr. R. S. Pitcher attended an international symposium on plant nematodes and Dr. R. V. Harris and Dr. A. F. Posnette a symposium on fruit tree virus disease.

Dr. D. W. P. Greenham reviewed research on soil management at the jubilee conference of the H.E.A. at Reading, and he also attended the British Weed Control Conference at Harrogate. Dr. R. L. Knight read a paper to the British Association on the genetical approach to disease resistance in plants. Dr. M. C. Vyvyan presented two papers at meetings of the Society for Experimental Biology on the redistribution of growth after stem pruning in trees, and the interrelation between the branch/trunk ratio, the relative growth rate and the increment in trunk diameter in fruit trees. Mr. H. W. B. Barlow and Mr. C. R. Hancock presented a paper at this Society on growth promoting and inhibiting substances in woody shoots.

At a symposium on the biological aspects of the transmission of disease arranged by the Institute of Biology, Dr. J. E. Crosse gave a paper on the dispersal of bacterial plant pathogens. Dr. M. H. Moore addressed the N.A.A.S. Plant Pathologists' Conference on concentrate spraying.

Other meetings of learned societies and conferences of research workers and advisers were attended by members of staff, who on many occasions also contributed to the discussions.

INFORMATION SERVICES

Enquiries concerning problems under investigation included over 1,600 letters. The majority of these were answered by the Scientific Liaison Section, with assistance as necessary from the appropriate specialists, who answered personally 360 of the enquiries. Visits to growers' holdings have increased in number to 87, of which 17 were in connection with the Collar Rot disease of apple trees.

EXHIBITS

Research on rootstock/scion incompatibility was illustrated in an exhibit at the Chelsea Flower Show, dealing especially with the anatomical structure of the union and showing practical methods of overcoming incompatibility in the nursery and orchard.

In February, as already noted, a special exhibit of the apple Tydeman's Late Orange was staged at the R.H.S. Show. The exhibit showed how the variety was bred and included plates of selected fruits and trays packed for market.

VISITORS

We received almost 2,100 visitors during the year. Many of the 475 who came from overseas were on their way to or from the International Horticultural Congress in Holland. We were particularly pleased to welcome from the U.S.A., Mr. F. R. Cullinan, Chief of the Horticultural Crops Research Branch, Beltsville, Professor H. B. Tukey, Head of the Department of Horticulture, Michigan State College, Dr. E. G. Fisher, of Cornell University, Ithaca, New York, Dr. J. R. Shay, Head of the Department of Plant Pathology, and Dr. C. L. Burkholder, Assistant Head of Department of Horticulture, both of Purdue University, Lafayette; from Canada, Mr. D. S. Blair, Principal Horticulturist, Central Experimental Farm, Ottawa, Dr. G. H. Berkeley, Senior Plant Pathologist, St. Catharines, Ontario, Dr. A. A. Hildebrand, Senior Plant Pathologist, Harrow, Ontario, Dr. R. E. Fitzpatrick, Senior Plant Pathologist, Vancouver, Dr. T. Taylor, Professor of Botany, University of British Columbia, Vancouver, and Dr. C. J. Bishop, Superintendent of Kentville Experimental Station, Nova Scotia; from Australia, Dr. W. A. T. Summerville, Director of the Division of Plant Industry, Brisbane; from Tasmania, Mr. W. F. Walker, Chief Horticulturist; from New Zealand, Dr. W. M. Hamilton, Secretary, D.S.I.R., Wellington, Mr. J. D. Atkinson, Director, Fruit Research Station, Owairaka, and Mr. H. R. Sampson, Director, N.Z. Apple and Pear Marketing Board; from South Africa, Dr. A. J. Van der Merwe, Assistant Chief, Horticultural Division, Pretoria, Dr. H. L. Pearse of the Central Tobacco Research Station, Transvaal, and Colonel D. Cunningham of Elgin; from Sweden, Professor F. Nilsson, Director, Alnarp Research Station; from Denmark, Dr. B. Jørgensen, Director, Spansbjerg Research Station; from the Netherlands, Dr. ten Houten and members of his staff from the Institute of Phytopathology Research, Wageningen, and Mr. M. A. Erkelens, Director of the Dutch plant certification service; and from Poland, Dr. S. A. Pieniazek, Director of the Skierniewice Institute of Pomology.

Parties of visitors included members of the Commonwealth Agricultural Bureaux Review Conference, the British Mycological Society, which held its plant pathology field day at the Station, the Royal Horticultural Society's Fruit Group, Cambridgeshire Farmers' Union, Somerset Fruit Growers' Club, Wisbech and District Fruit Growers' Association, the British Council Horticultural Society, and students from Reading University, Wye College, and Imperial College, London. From overseas we welcomed a party of Dutch officers of the Ministry of Agriculture, The Hague, led by Dr. B. K. Bartelds, Director of Horticultural Education, Dutch fruit growers, German growers led by Dr. Loewel, French growers led by Mons. R. Bonnicel, the Scientific Commission of the European Hops Culture Committee, four delegates from the Gold Coast to the Cocoa Conference in London and several parties of Colombo Plan students.

Members of the horticultural staff of the N.A.A.S. and the Local Education Authorities visited the Station for the dress rehearsals that preceded the three Members' Days and for the Amos Memorial Lecture. They also attended the annual two-day programme that forms such a valuable link between the individual research worker and advisory officer. The usual refresher courses were held for those concerned with the certification of hops and rootstocks. In all, some 240 officers visited us on these occasions, apart from many individual visits in connection with specific problems.

LECTURES AND DEMONSTRATIONS

Members of staff visited many parts of the country, including Hereford, Leicester, Oxford, Berkshire, Norfolk, Essex, Hampshire and Sussex as well as Kent, to give to growers, advisory officers and students 39 lectures on various aspects of the research programme. Five served on "brains trusts" at Chelmsford and at the R.H.S., London. Three demonstrations of pruning were given in collaboration with the N.A.A.S., at Pulborough, Colchester and Faversham.

Assistance was given with the fruit judging at the Maidstone Cherry and Soft Fruit, the Marden, and the East Kent Fruit Shows and at the Annual Ploughing Match of the Gravesend and Rochester Agricultural Society, and the horticultural shows at Platt and West Malling. An examiner was again supplied for the N.D.H. Finals in Section III, Fruit Crop Husbandry.

DISTRIBUTION OF EXPERIMENTAL MATERIAL

An account of the year's work in our experimental nurseries will be found in the Research Report. From July until March there is constant activity in receiving, allocating, lifting, packing and despatching innumerable orders for research purposes at home and abroad, for educational use and for our Members. This year research demands have been swelled by requests for indicator plants for virus indexing from many Stations engaged in the study of virus diseases of fruit plants.

Much careful work in the experimental nurseries still goes into the virus-testing of trees and plants in the experiments in progress at the Station. Apart from this, we are actively engaged in the multiplication of virus-tested clones of both established and new rootstock varieties. Some of the new stoolbeds that have been laid down for this purpose will in due course be coming into production, when we anticipate a considerable demand from research workers for rootstocks free from virus diseases.

In the distribution list for 1955-56, the four Woolly Aphid resistant Malling-Merton rootstocks and M.XXV were offered to Members for the third year. Since October 1955 they have been free of all restriction as to their further distribution and, already, we note

that trees worked on them are being offered in the Trade. The demand for some of these new rootstocks both at home and from abroad has been overwhelming and we would ask Members who are only allocated a fraction of their requirements to bear with us and remember that we are not a commercial nursery, but are doing our best to divide our production as fairly as possible among Members of the Association.

The mother tree scheme is now beginning to develop and, although some growers and nurserymen have been slow in using it, its value as a source of clean material for the propagation of the fruit trees of the future is beginning to be realized. In the third year of the scheme, ten cherry varieties were offered (with virus-free F12/1 rootstocks on which to work them), Amber (Kent Bigarreau), Bigarreau Gaucher and Merton Favourite being added to those already issued.

For the first time we were able to offer virus-tested apple varieties, all on virus-free rootstocks, under the scheme. The first to come forward were Tydeman's Late Orange, Laxton's Superb, Lord Lambourne and Cox's Orange Pippin, and the few maiden trees we were able to offer were eagerly taken up. We are still a little doubtful, however, whether all those who ask for them realize that these trees are intended as *clean source plants for the production of scionwood for further propagation* and are as yet too scarce and valuable for ordinary orchard planting.

Black currants this season are in heavy demand and, apart from a few Amos Black bushes and cuttings we regret we had few to offer. But we note that our attempt to provide small sets of black and red currants and of gooseberries for planting in Members' gardens seems to have been appreciated.

In May 1955 we gave Members an advance list of the main items of plant material likely to be offered in the distribution list which is sent out in July. While we cannot vouch for the accuracy or completeness of this forecast, we hope that it will give Members some idea of what we are likely to have. We would emphasize that some material is in very short supply and would urge those who want to obtain a share to get their orders in by the closing date.

HISTORIC FRUIT TREES

Members may like to be informed of one small part of our activities that is of some horticultural interest.

Some years ago young trees were propagated at East Malling from a 200-year-old apple tree in the garden of Sulgrave Manor, near Banbury, the ancestral home of George Washington. These were sent to America in 1949 for planting at Mount Vernon, Washington's National Memorial in the United States. The variety was identified as Northern Greening. We have not heard of these trees since they were planted, but hope we shall do so in due course.

Plants believed to be descended from Sir Isaac Newton's apple tree in the garden of Woolsthorpe Manor, near Grantham, and considered to be the variety Flower of Kent, have now been established in several places where his name is honoured. As long ago as 1944, four trees were sent to America and were planted there by the Pennsylvania Historical Commission who intended to recreate the home of William Penn and were anxious to plant in the garden there a descendent of Newton's tree at Woolsthorpe Manor. While we have had no fruiting tree on the Station since the spring of 1954, standard trees have been planted in the Fellow's Garden at Queen's College, in Newton's Garden at Trinity College, and in the Botanic Garden, Cambridge. Another tree has been planted in the garden at Hatfield House, through Lady Salisbury's interest in historic trees, while yet another has been sent to be planted at the Dominion Physical

Laboratory, New Zealand. The interest of Sir Stephen Tallents in this historic tree is shown by his article in the R.H.S. Fruit Year Book for 1955.

It may be remembered that, in 1953, we planted a Mulberry tree at the Station to commemorate the coronation of H.M. the Queen. This tree was propagated from an ancient tree in the Chelsea Physic Gardens, believed to have been included in the first plantings when the garden was laid out in 1673, but unfortunately removed in 1939 to make room for an air raid shelter. In November 1954, a sister tree was planted by Sir Winston Churchill in the garden of the London house of Lord and Lady Salisbury, which adjoins, and originally formed part of, the Physic Gardens. Mr. Garner, who raised the tree by layering a small tree established from a cutting collected by the late Dr. R. C. Knight in 1929, Dr. Montgomery, and the Curator of the Gardens, were among the small but distinguished party which was present for the planting.

STATION'S PUBLICATIONS

Publications during the year numbered 65, with 46 scientific papers and 19 practical articles for fruitgrowers. These are all listed in Part II of the Research Report.

Journal of Horticultural Science

We recorded in the last Report the untimely death in February 1955 of Dr. W. M. Ware, Assistant Editor since 1948. The joint editors were very grateful to Professor W. Brown who stepped into the breach and assisted them to complete the editing of the current volume. We are glad to report now that Professor Brown has agreed to continue as Assistant Editor for future volumes.

Quarterly production was maintained during 1955, in which Volume XXX was published. The scope of the Journal is very wide and it has to compete for its contributions with several more specialized journals. It is encouraging, therefore, and is some indication of the high standard of its content, to report a marked increase in circulation during the year. This has enabled the year's accounts to show a small profit without subsidy—the first for several years.

The Journal is sponsored by Long Ashton and East Malling, but numbers among its contributors members of the staff of all the other horticultural research institutes in this country. Volume XXX contained 28 papers of which the sponsoring institutes contributed 18. It was comprised of scientific papers concerning fruit, vegetables and flowers, reporting many aspects of research, the main characteristic in common being that the papers were of interest to horticulturists.

LIBRARY COMMITTEE

The processes of working off arrears of routine work and straightening out the unbound literature, occasioned by the major move reported last year, have been continued. Searching for items from the unbound literature is much easier as a result of more extensive shelving, and as soon as that in the store is finally completed a further spacing out will be possible, thus reducing still further the remaining instances where two or more journals share the same storage space.

The library has been used gradually more and more each year since data have been kept. This year a record of 3,944 books, journals and pamphlets were issued and, in addition, 491 items were borrowed from other libraries for use here. Seven hundred and eighty-two journal parts were circulated on the automatic system internally in the Station, and an equivalent number were dealt with in connection with the Commonwealth Bureau Botanical Pool.

In all 1,234 pamphlets, 52 books and 176 bound volumes were added to the Station library, and during the same period, 993 pamphlets, 64 books and 71 bound volumes were added to the Bureau library. There were also unrecorded numbers of annual reports and separate parts of periodicals, but it may be of interest to note that during the year 621 different journals were being currently received, some in duplicate, and in addition the Bureau was regularly making abstracts from a further 73 from other libraries.

Finally, it remains to thank those who have made gifts of books, pamphlets and regular supplies of periodicals. These have often been spontaneous, sometimes in response to our expressed interest in seeing some publication, and all are equally appreciated.



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THE JOURNAL OF HORTICULTURAL SCIENCE

THE JOURNAL OF HORTICULTURAL SCIENCE, which is sponsored by the Long Ashton Research Station and the East Malling Research Station, welcomes contributions on horticultural science from Research Institutes at home and abroad. Papers for publication and all communications should be sent to the Editors at East Malling Research Station, Maidstone, Kent.

The current VOLUME XXXI (1956) contains papers from both the sponsor Research Stations and, among others, from the John Innes Horticultural Institution, Scottish Horticultural Research Institute and Reading University. The subjects discussed include studies on the effects of light quality on the growth and development of plants, boron nutrition of the hop, predacious spiders in orchards in south-eastern England, effects of controlled root temperatures on the growth of East Malling rootstocks in water culture, the influence of soil and air temperatures on cropping of glasshouse tomatoes, two methods for the bioassay of auxins in the presence of growth inhibitors, studies on the etiology and mode of spread of Scottish raspberry leaf curl disease, apple mosaic viruses, and cocoa pod production in relation to the incidence of black-pod disease.

The Journal is issued in quarterly parts and is published by Messrs. Headley Brothers, 109 Kingsway, London, W.C.2, to whom intending subscribers should apply. The subscription rates are 50 shillings per volume (rate for Canada and the U.S.A., \$7.00) or 15 shillings for a single number.

HORTICULTURAL ABSTRACTS

A quarterly journal compiled by The Commonwealth Bureau of Horticulture and Plantation Crops, East Malling, Kent, from world literature on research and progress in the cultivation of:

Temperate and tropical fruits
Vegetables
Ornamentals
Plantation crops

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